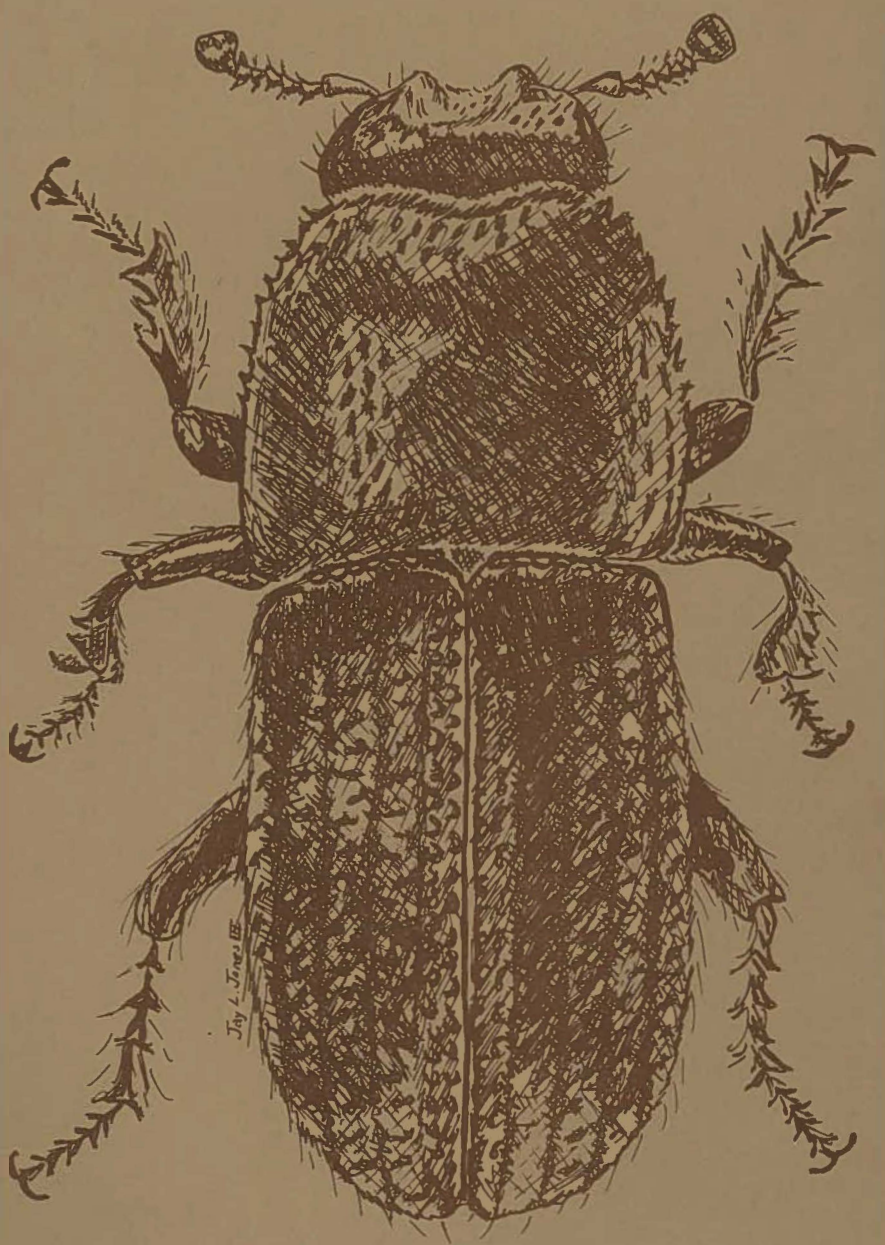
FOREST PEST ACTIVITY 1969



CIRCULAR 201

TEXAS FOREST SERVICE

FOREST PEST ACTIVITY IN TEXAS-1969

by
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and
Jay L. Jones III

FOREST PEST CONTROL SECTION
Lufkin, Texas

Private Forest Industry
U. S. Forest Service
Texas Agricultural Extension Service
and
Texas Agricultural Experiment Station
Cooperating

TEXAS FOREST SERVICE
A Part Of
The Texas A&M University System

Forest Pest Activity In Texas-1969

Introduction

Texas forests have been under attack by a variety of pests for many years, the most destructive being the Southern pine beetle. This report was initiated at the request of the Texas Forest Pest Committee to record the annual losses caused by forest pests and to serve as a historical record of forest pest activity in Texas.

Insects

SOUTHERN PINE BEETLE *Dendroctonus frontalis*. Due to an extremely hot, dry summer, the Southern pine beetle epidemic did not attain the proportions that early Spring detection flights had indicated. In contrast to the approximate 4.5 million cubic feet of merchantable pine timber killed in 1968, the 1969 volume was 1.7 million cubic feet. Although total losses were less, damage was spread over a greater area with the total epidemic area increasing from approximately 6 million to about 6.3 million acres (Figure 1).

In January 1969, the Texas Forest Service initiated Southern pine beetle detection flights over private lands in East Texas. Monthly flights were made in January, February and March; every three weeks during April through August; and monthly in September and October. The flights were made in single-engine, high-wing aircraft at an altitude of 1500 feet on North-South flight lines spaced at 2.5-mile intervals. Only multiple tree spots of five or more trees were recorded during beetle detection flights.

Monthly Southern pine beetle infestation levels are presented in Table 1. The infestation peak occurred in June 1969 as it did in 1968. However, the 1969 peak (540 spots) is about one-third of the 1846 spots detected in June of 1968.

TABLE 1. Spots Detected by Aerial Observation, 1969.

MONTH	NEW SPOTS DETECTED
January	104
February	142
March	113
April	117
May	104
June	504
July	325
August	88
September	119
October	20
November	*
December	*
TOTAL	6177 / 677

*No flights were made.

Figure 2 depicts new spots detected each month for the last four years. As can be seen, the 1969 infestation level is the lowest in four years. Neither Table 1 nor Figure 2 include reports of infestations on the Texas National Forests.

The infestation area remained relatively static in the southern half, but slight northward and westward advancements were evident in the northern portion. The most noticeable advancements were westward into Montgomery and Walker Counties. Southern pine beetles were

Figure 1

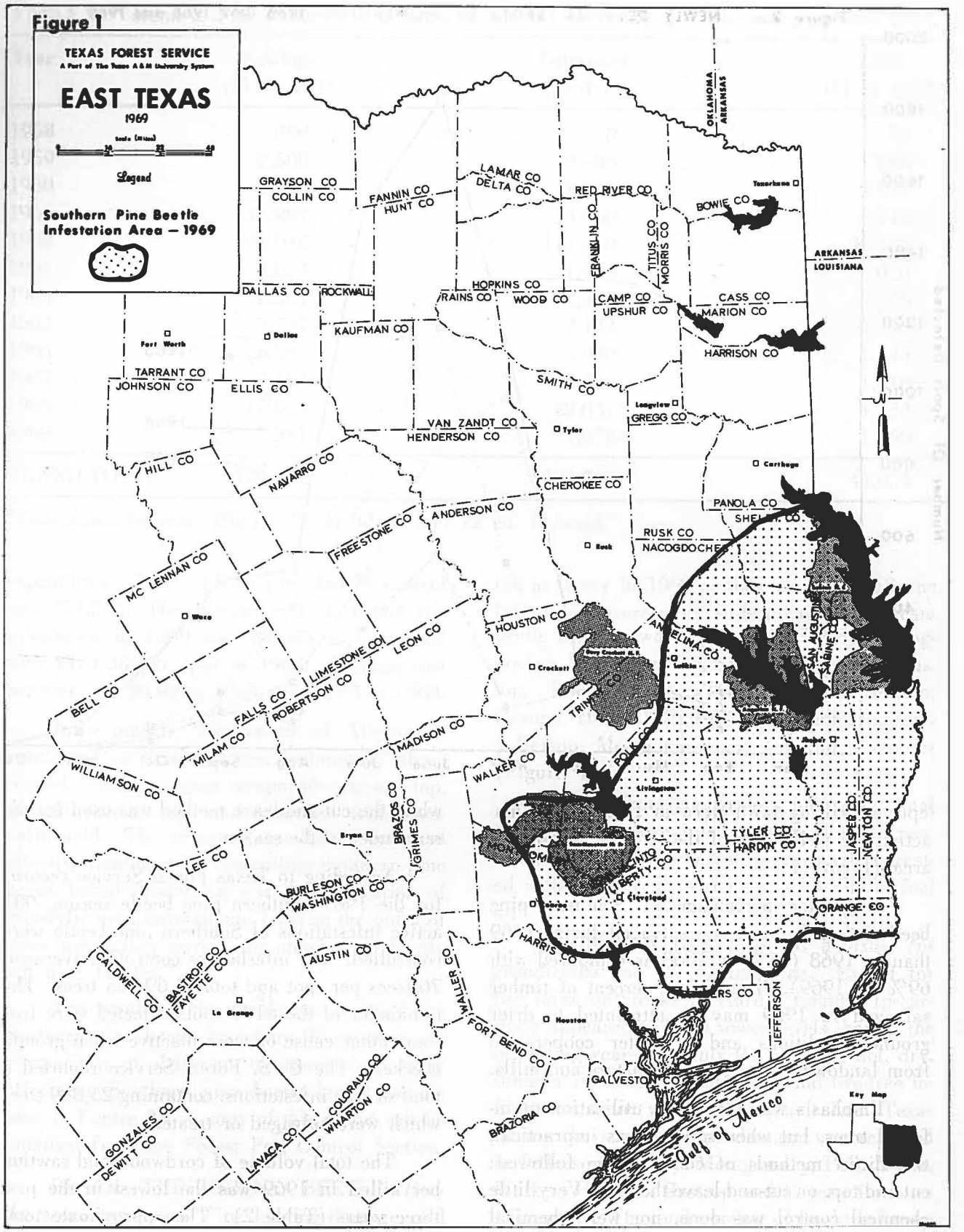
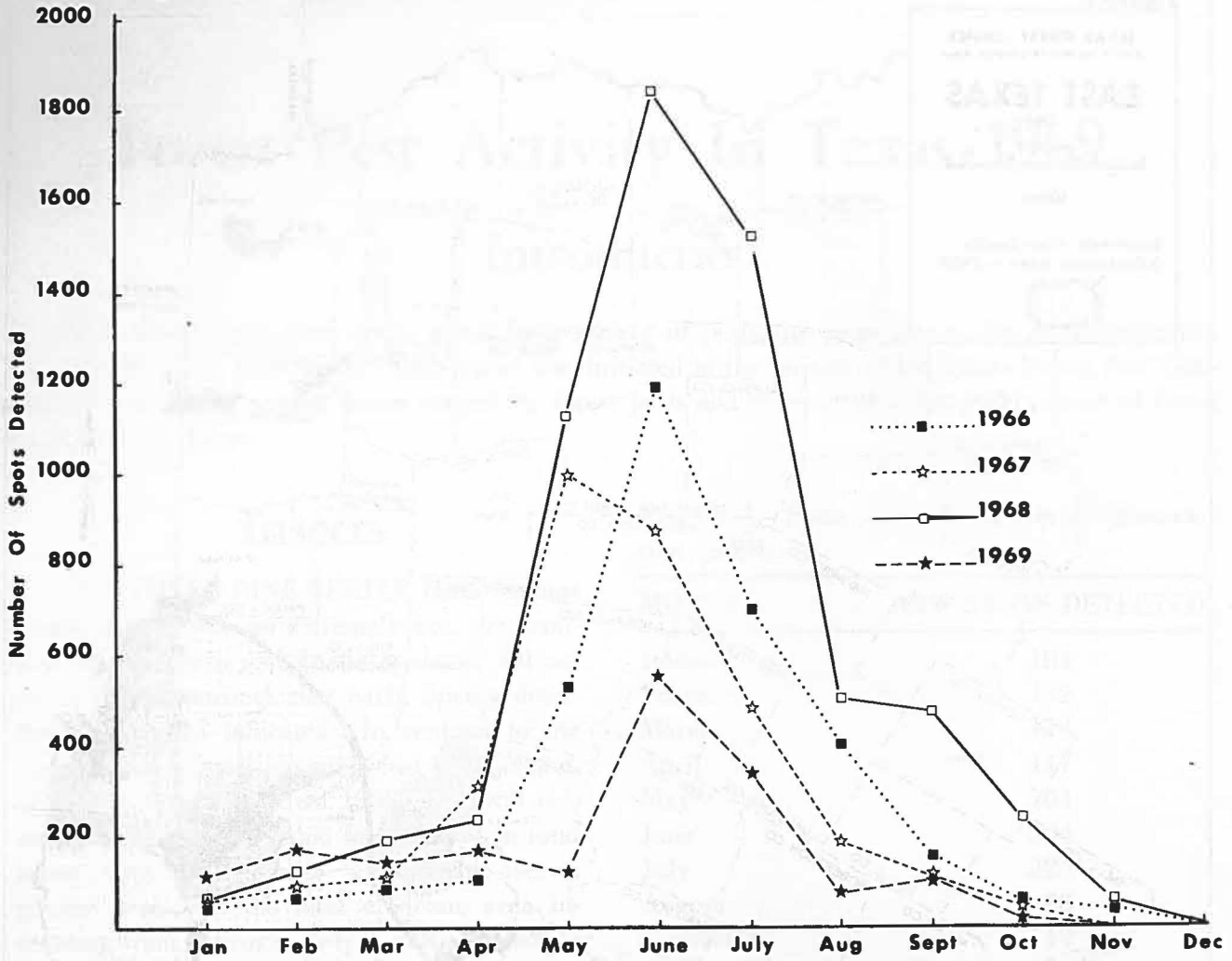

TEXAS FOREST SERVICE
A Part of The Texas A&M University System
EAST TEXAS
1969
Legend
Southern Pine Beetle Infestation Area – 1969
OKLAHOMA
ARKANSAS
GRAYSON CO
COLLIN CO
FANNIN CO
HUNT CO
LAMAR CO
DELTA CO
RED RIVER CO
BOWIE CO
FRANKLIN CO
TITUS CO
MORRIS CO
ARKANSAS
LOUISIANA
DALLAS CO
ROCKWALL
HOPKINS CO
RAINS CO
WOOD CO
CAMP CO
UPSHUR CO
CASS CO
MARION CO
HARRISON CO
KAUFMAN CO
Fort Worth
Dallas
TARRANT CO
JOHNSON CO
ELLIS CO
SMITH CO
Longview
GREGG CO
VAN ZANDT CO
HENDERSON CO
Tyler
HILL CO
NAVARRO CO
CHEROKEE CO
Carthage
PANOLA CO
SHELBY CO
RUSK CO
NACOGDOCHES
FREESTONE CO
ANDERSON CO
MC LENNAN CO
Waco
HOUSTON CO
ANGELINA CO
SAN AUGUSTINE CO
SABINE CO
LIMESTONE CO
LEON CO
Crockett
TRINITY CO
BELL CO
FALLS CO
ROBERTSON CO
MILAM CO
MADISON CO
POLK CO
WILLIAMSON CO
WALKER CO
BRAZOS CO
GRIMES CO
Bryan
TYLER CO
HARDIN CO
JASPER CO
NEWTON CO
LEE CO
BURLESON CO
WASHINGTON CO
LIBERTY CO
ORANGE CO
CALDWELL CO
BASTROP CO
FAYETTE CO
AUSTIN CO
HARRIS CO
WALLER CO
La Grange
Houston
FORT BEND CO
JEFFERSON
GONZALES CO
DE WITT CO
COLORADO CO
WHARTON CO
LAVACA CO
GALVESTON CO
BRAZORIA CO
Gulf of Mexico
Key Map

Figure 2. NEWLY DETECTED SPOTS BY MONTH FOR 1966, 1967, 1968 and 1969



reported killing lawn trees in Longview. This activity is well north of the existing infestation area (Figure 1).

A greater percentage of Southern pine beetle infested timber was salvaged during 1969 than in 1968 (53% in 1968 as compared with 69% in 1969). The higher percent of timber salvaged in 1969 may be attributed to drier ground conditions and to better cooperation from landowners, logging contractors and mills.

Emphasis was placed on utilization of infested trees, but when salvage was impractical, two direct methods of control were followed: cut-and-top, or cut-and-leave-the-top. Very little chemical control was done, nor were chemical control methods recommended except on high value trees such as ornamentals. The cut-and-top control method was used through mid-June, while the cut-and-leave method was used for the remainder of the season.

According to Texas Forest Service records for the 1969 Southern pine beetle season, 901 active infestations of Southern pine beetle were controlled. The infestations controlled averaged 76 trees per spot and totaled 69,355 trees. The remainder of the 6177 spots detected were fror some other cause or were inactive when ground checked. The U. S. Forest Service reported a total of 476 infestations, containing 25,889 trees which were salvaged or treated.

The total volume of cordwood and sawtimber killed in 1969 was the lowest in the past three years (Table 2). The approximate total acreage on which pine timber was killed in 1969 was 1546 acres as compared with 4073 acres in 1968. During the 1969 calendar year, total

TABLE 2. Volume of Pine Timber Killed by the Southern Pine Beetle in Southeast Texas Since 1958.

Year	Sawlogs (M bd. ft.)*	Pulpwood (cords)*	Total (M cu. ft.)*
1958	500	0	84
1959	2,500	2,500	598
1960	8,000	8,000	1,912
1961	17,887	24,000	4,715
1962	93,043	111,110	23,538
1963	4,084	1,920	820
1964	2,501	1,420	520
1965	3,797	7,743	1,192
1966	6,256	6,930	1,544
1967	7,194	8,566	1,818
1968	17,644	22,037	4,533
1969	7,341	7,478	1,760
GRAND TOTAL	170,747	201,704	43,034

*Conversion factors: 167 cu. ft./M bd. ft. and 72 cu. ft./cord.

expenditures for Southern pine beetle control was $73,570. The average cost of control per infestation in 1969 was $81.65 as compared with $161.38 per spot in 1968. Average cost per tree was $0.99 in 1969 and $2.05 in 1968.

In a report, "Evaluation of Alternative Southern Pine Beetle Control Techniques," three control techniques were compared—cut-and-top, cut-and-leave-the-top, and treatment with cacodylic acid. The report states that, "the most effective treatment for controlling Southern pine beetle brood production was an application of cacodylic acid through axe frills in the boles of trees just as they were being attacked by Southern pine beetles."

The result of this treatment reduced the Southern pine beetle brood by 97 percent. A comparison of different treatments and their efforts on Southern pine beetle brood can be seen in Figure 3. A copy of this report can be obtained from the Forest Pest Control Section.

BLACK TURPENTINE BEETLE *Dendroctonus terebrans.* Fire, logging damage, and dry weather conditions from June through October were the primary causes of black turpentine beetle infestations. Although infestations were not as heavy in 1969 as they were in 1968, the infestations were more widespread. Significant beetle damage was reported in Shelby, Nacogdoches, San Augustine, Sabine, Angelina, Houston, Trinity, Polk, Tyler, Jasper, Newton, Orange, Hardin, Walker, San Jacinto, Liberty, Jefferson, Montgomery and Colorado Counties (Figure 4).

Reports from cooperators indicate a total of 609 pines were infested with black turpentine beetle, 547 of which were salvaged or treated with 11 percent benzenehexachloride in fuel oil.

ENGRAVER BEETLES *Ips avulsus, Ips grandicollis* and *Ips calligraphus.* Except for two large outbreaks in Hardin County, Ips activity appeared to be at lower levels than in the preceding year—possibly the result of hot, dry, summer conditions. Many one- and two-tree infestations were visible throughout East Texas during the summer. Ips damage was reported in Jefferson, Liberty, Montgomery, Polk, Tyler, Walker, Houston, Bastrop and Fayette Counties (Figure 5). The total number of Ips killed trees reported in these counties was 445, however this figure does not include 125 acres treated and/or salvaged in Hardin County.

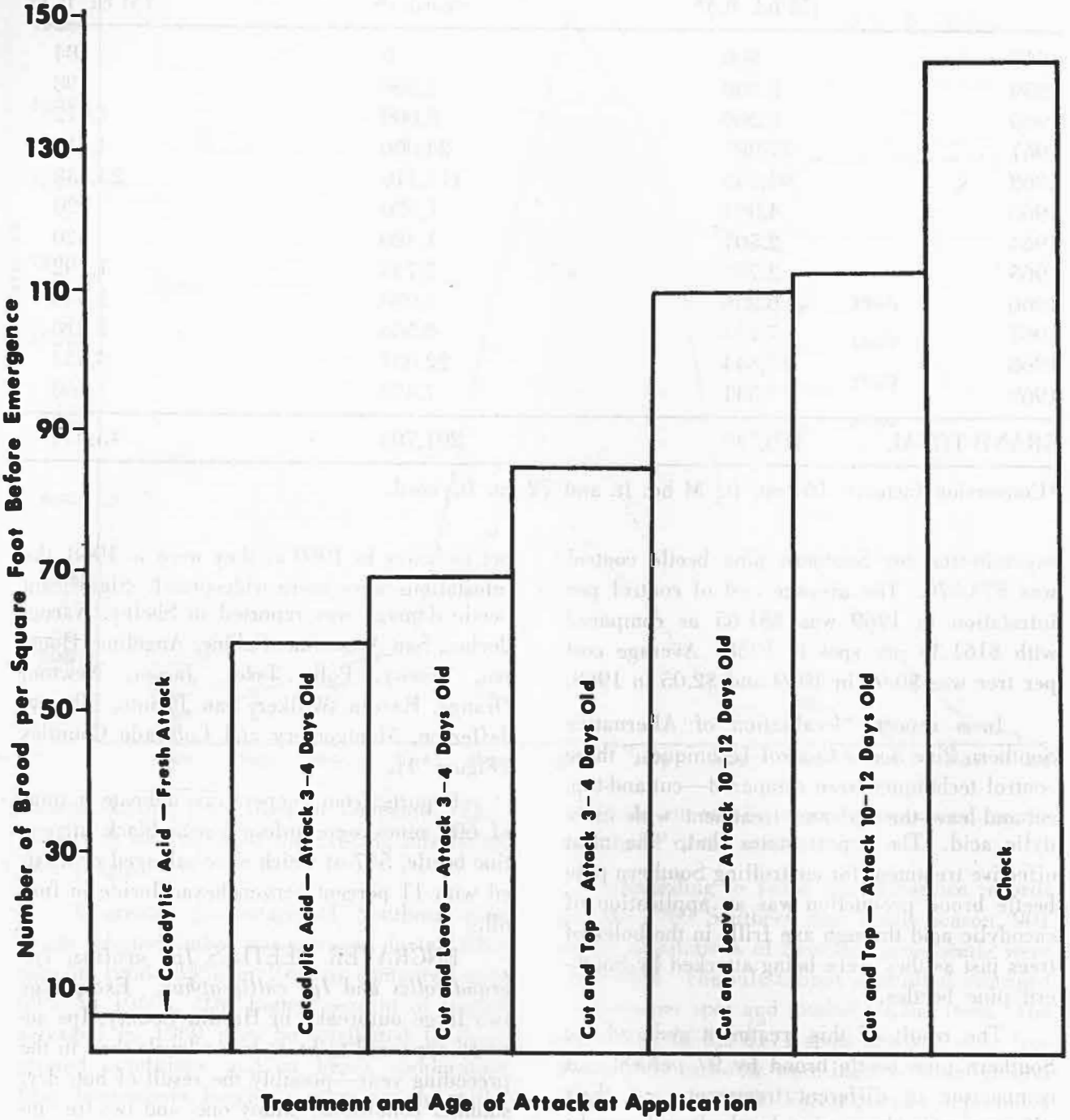


FIGURE 3 Effect of Treatment on Development of Southern Pine Beetle Brood Per Square Foot of Bark Surface.

Figure 4

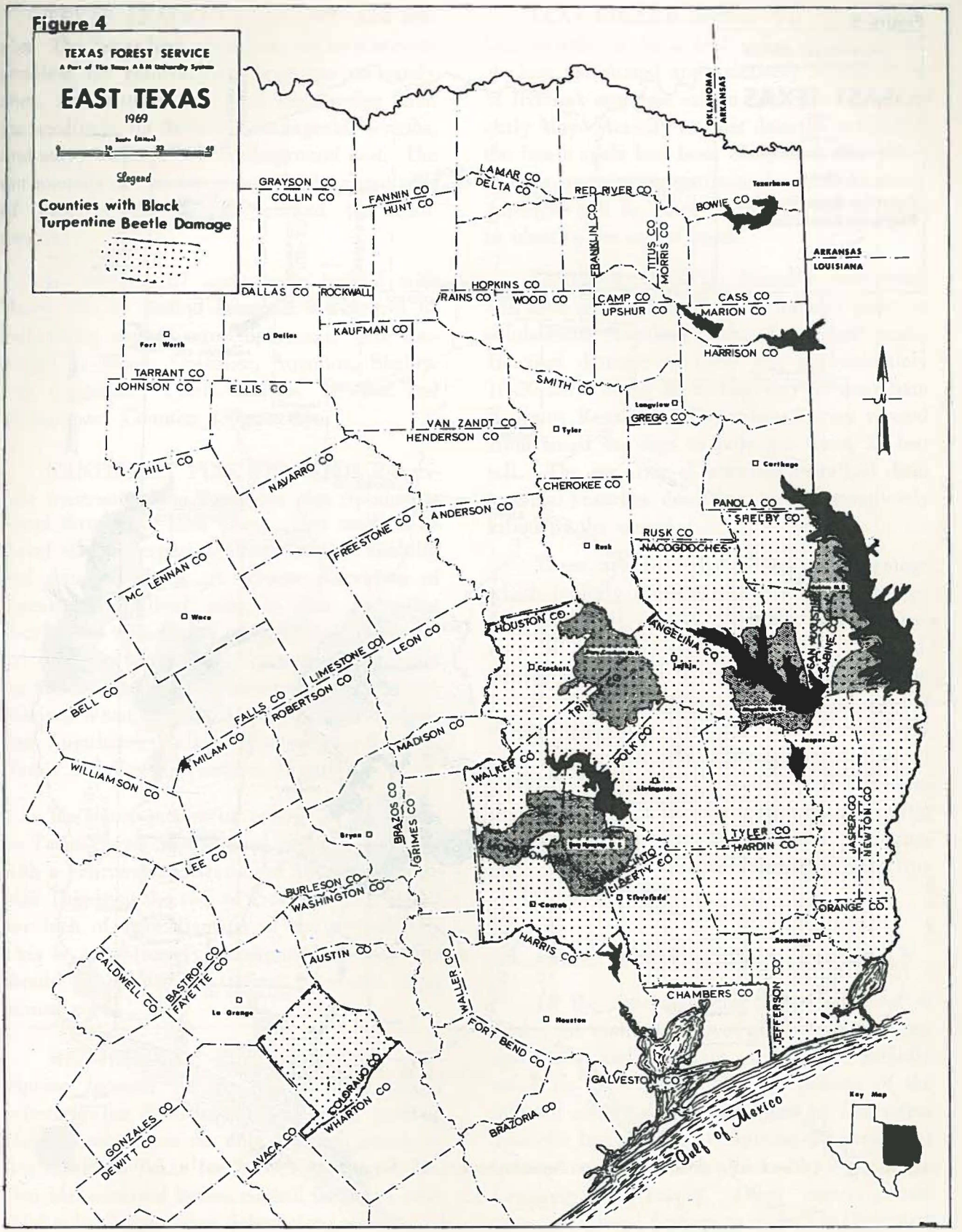
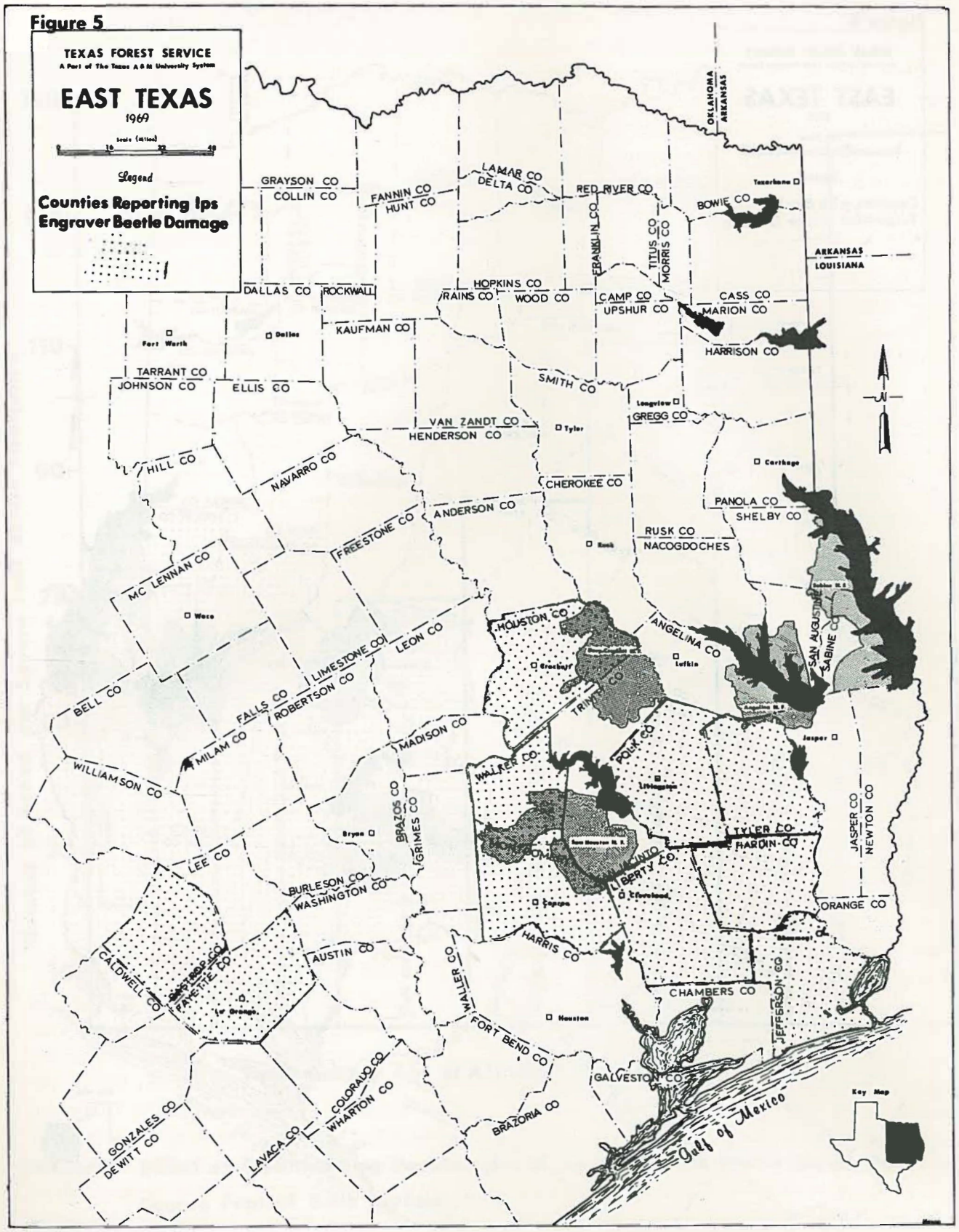

TEXAS FOREST SERVICE
A Part of The Texas A&M University System
EAST TEXAS
1969
Legend
Counties with Black Turpentine Beetle Damage
OKLAHOMA
ARKANSAS
ARKANSAS
LOUISIANA
GRAYSON CO
COLLIN CO
FANNIN CO
HUNT CO
LAMAR CO
DELTA CO
RED RIVER CO
FRANKLIN CO
TITUS CO
MORRIS CO
BOWIE CO
Texarkana
DALLAS CO
ROCKWALL
HOPKINS CO
RAINS CO
WOOD CO
CAMP CO
UPSHUR CO
CASS CO
MARION CO
HARRISON CO
Fort Worth
Dallas
KAUFMAN CO
TARRANT CO
JOHNSON CO
ELLIS CO
SMITH CO
Longview
GREGG CO
VAN ZANDT CO
HENDERSON CO
Tyler
Carthage
HILL CO
NAVARRO CO
CHEROKEE CO
PANOLA CO
SHELBY CO
ANDERSON CO
RUSK CO
NACOGDOCHES
FREESTONE CO
Rusk
MC LENNAN CO
Waco
HOUSTON CO.
ANGELINA CO.
SAN AUGUSTINE CO.
SABINE CO.
LIMESTONE CO
LEON CO
Crockett
Jasper
TRINITY CO.
BELL CO
FALLS CO
ROBERTSON CO
MILAM CO
MADISON CO
POLK CO.
WILLIAMSON CO
WALKER CO.
Livingston
BRAZOS CO
GRIMES CO
Bryan
MONTGOMERY CO.
TYLER CO
HARDIN CO
JASPER CO
NEWTON CO
LEE CO
LIBERTY CO.
BURLESON CO
WASHINGTON CO
Conroe
Cleveland
ORANGE CO.
Beaumont
HARRIS CO
AUSTIN CO
CALDWELL CO
BASTROP CO
FAYETTE CO
WALLER CO.
CHAMBERS CO
La Grange
Houston
FORT BEND CO
JEFFERSON CO.
GALVESTON CO
COLORADO CO
WHARTON CO
GONZALES CO
DEWITT CO
LAVACA CO
BRAZORIA CO
Gulf of Mexico
Key Map

Figure 5


TEXAS FOREST SERVICE
A Part of The Texas A & M University System
EAST TEXAS
1969
Legend
Counties Reporting Ips Engraver Beetle Damage
OKLAHOMA
ARKANSAS
GRAYSON CO
COLLIN CO
FANNIN CO
HUNT CO
LAMAR CO
DELTA CO
RED RIVER CO
BOWIE CO
FRANKLIN CO
TITUS CO
MORRIS CO
ARKANSAS
LOUISIANA
DALLAS CO
ROCKWALL
HOPKINS CO
RAINS CO
WOOD CO
CAMP CO
UPSHUR CO
CASS CO
MARION CO
HARRISON CO
KAUFMAN CO
TARRANT CO
JOHNSON CO
ELLIS CO
SMITH CO
GREGG CO
VAN ZANDT CO
HENDERSON CO
HILL CO
NAVARRO CO
CHEROKEE CO
PANOLA CO
SHELBY CO
RUSK CO
NACOGDOCHES
FREESTONE CO
ANDERSON CO
MC LENNAN CO
HOUSTON CO
ANGELINA CO
SAN AUGUSTINE CO
SABINE CO
LIMESTONE CO
LEON CO
BELL CO
FALLS CO
ROBERTSON CO
TRINITY CO
POLK CO
MILAM CO
MADISON CO
WALKER CO
WILLIAMSON CO
BRAZOS CO
GRIMES CO
JASPER CO
NEWTON CO
TYLER CO
HARDIN CO
LEE CO
BURLESON CO
WASHINGTON CO
SAN JACINTO CO
LIBERTY CO
ORANGE CO
CALDWELL CO
BASTROP CO
FAYETTE CO
AUSTIN CO
HARRIS CO
WALLER CO
CHAMBERS CO
JEFFERSON CO
FORT BEND CO
GALVESTON CO
GONZALES CO
DEWITT CO
LAVACA CO
COLORADO CO
WHARTON CO
BRAZORIA CO
Gulf of Mexico
Key Map

TEXAS LEAF-CUTTING ANT *Atta texana.* The Texas leaf-cutting ant can be a serious problem for reforestation programs on sandy sites. Leaf-cutting ants strip the needles from the seedlings, cut them into manageable lengths, and carry them to their underground nest. The ant mounds can be recognized by the abundance of pine needle cuttings around the main entrance.

In 1969, 8157 acres were treated with Mirex 450 or methyl bromide for control of leaf-cutting ants. Control operations were conducted in Wood, Cherokee, Angelina, Shelby, San Augustine, Tyler, Hardin, Newton and Montgomery Counties (Figure 6).

NANTUCKET PINE TIP MOTH *Rhyacionia frustrana.* The Nantucket pine tip moth is found throughout East Texas. This moth in its larval stage is especially destructive to loblolly and shortleaf pines. A 25-acre plantation of 8-year-old shortleaf pine in San Augustine County had virtually all of its lateral and terminal branches attacked by tip moth. Significant tip moth damage was reported also in Cass, Marion, Wood, Upshur, Gregg, Rusk, Angelina, San Augustine, Walker, Montgomery, Liberty, Harris and Fayette Counties (Figure 7).

The most successful control of tip moths on Texas Forest Service seed orchards has been with a February application of 10 percent granular Thimet at the rate of 2 ounces of granules per inch of stem diameter at the ground line. This is an extremely dangerous pesticide and should be applied by trained personnel using utmost care.

RED-HEADED PINE SAWFLY *Neodiprion lecontei.* A red-headed pine sawfly infestation on 5000 loblolly and slash pines in Harris County was the only reported attack by this insect in Texas for 1969. Partial defoliation had occurred before control measures were initiated. Other minor infestations were noted at various locations in Southeast Texas, but the buildup did not reach levels which demanded direct control measures.

LEAF ROLLER *Archips spp.* A caterpillar, thought to be a leaf roller of the genus *Archips,* defoliated approximately 50,000 acres of live oak and post oak in Colorado County in early May. Activity was not detected until after the insect cycle had been completed, thus there were no remaining specimens for identification. Attempts will be made in the Spring of 1970 to identify the causal agent.

DEODAR WEEVIL *Pissodes nemorensis* has been observed feeding on loblolly pines in southeastern Angelina County for several years. Heaviest damage in 1969 was approximately 10-20 acres along U. S. Highway 69 near Sam Rayburn Reservoir. The infested trees ranged from small saplings to pole-size trees, 25-feet tall. The majority of attacked trees had dead terminal branches, dead tops, or were completely killed by the weevil.

There are four distinct types of damage which loblolly pines exhibit when attacked by *P. nemorensis.* First, seedlings and saplings may be girdled and killed quickly. Second, trees 15-40 feet tall may have only the top killed. Open-grown trees in old fields exhibit this symptom most often. Third, a tree of any size may be severely attacked by the weevil with a loss of nearly all needles except those at the branch ends at the top of the crown. Fourth, scattered branches may be infested and this suggestion by other workers appears to hold true in Texas.

Cone and Seed Insects

Of the cone and seed insects observed in Texas, the moth *Dioryctria amatella* is the most destructive and abundant. A count of loblolly cones in 1969 showed that 83 percent of the infested cones had been damaged by *Dioryctria amatella* larvae. The remaining 17 percent of infested cones had been attacked by a fly of the Cecidomyiidae family. Other insects which cause occasional damage to cones are *Dioryctria clarioralis, Laspeyresia spp.* and *Rhyacionia frustrana.* Two hemipterous insects which feed on immature seed endosperm are *Leptoglossus*

Figure 6

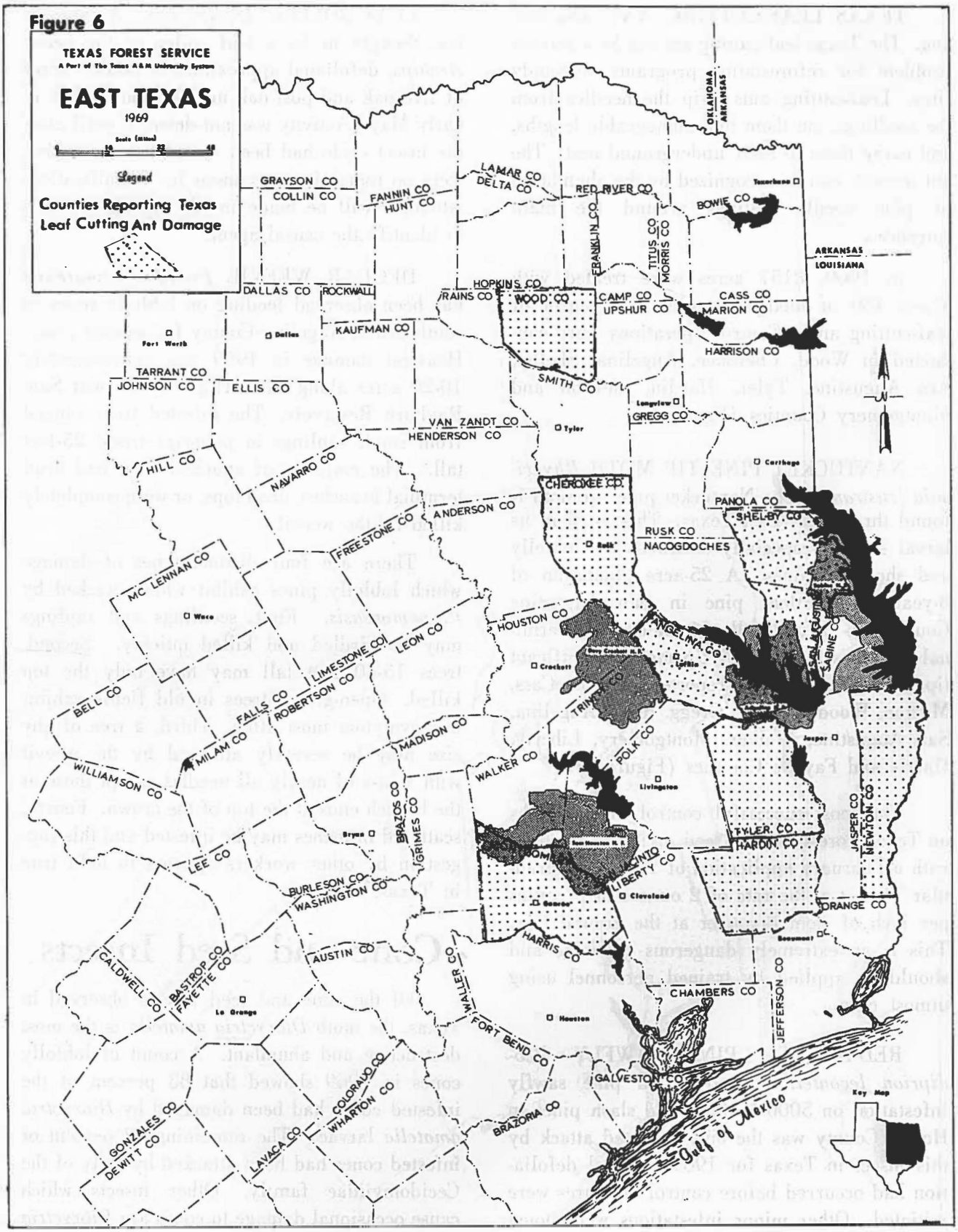
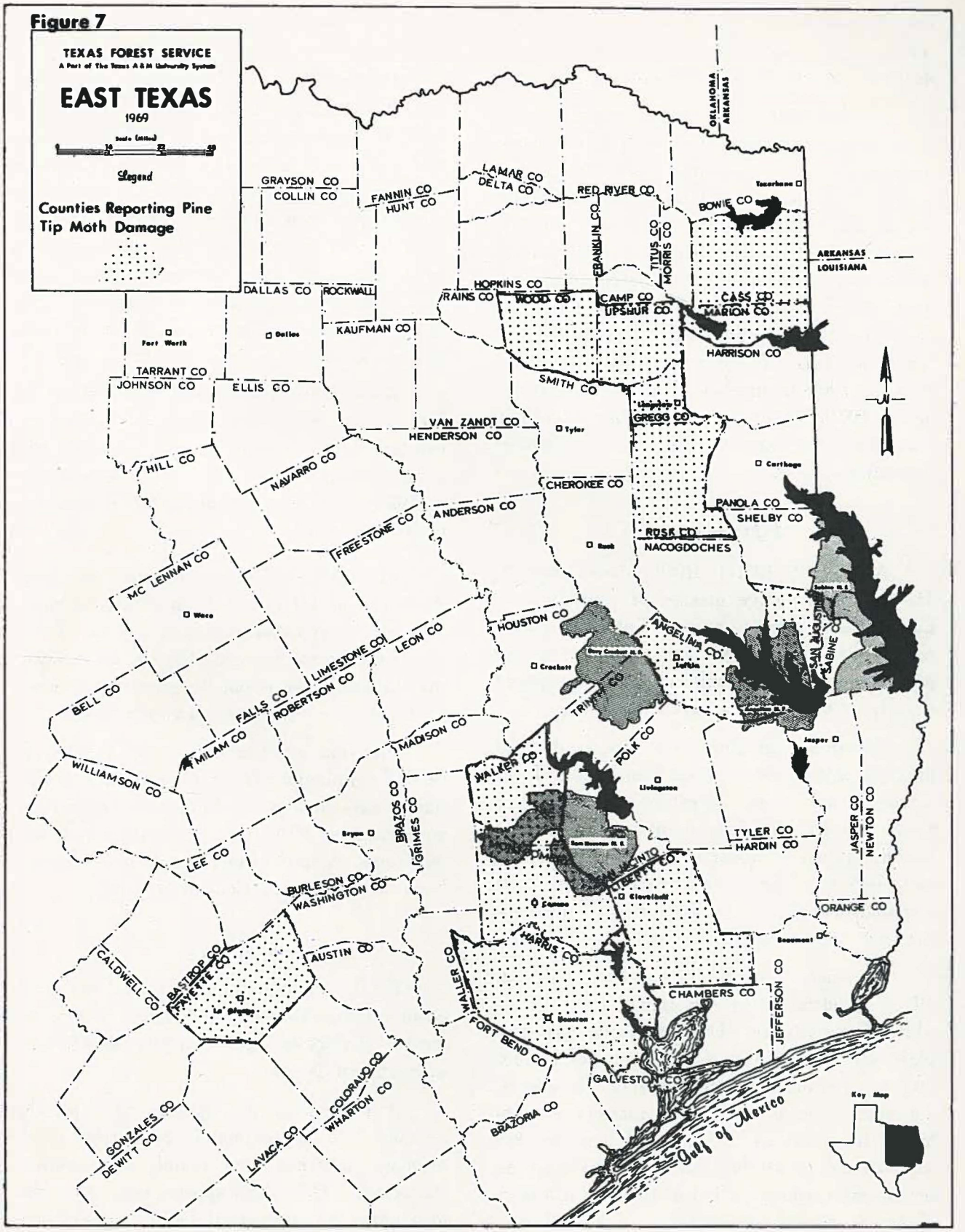

TEXAS FOREST SERVICE
A Part of The Texas A&M University System
EAST TEXAS
1969
Legend
Counties Reporting Texas Leaf Cutting Ant Damage
OKLAHOMA
ARKANSAS
GRAYSON CO
COLLIN CO
FANNIN CO
HUNT CO
LAMAR CO
DELTA CO
RED RIVER CO
FRANKLIN CO
TITUS CO
MORRIS CO
BOWIE CO
ARKANSAS
LOUISIANA
DALLAS CO
ROCKWALL
HOPKINS CO
RAINS CO
WOOD CO
CAMP CO
UPSHUR CO
CASS CO
MARION CO
HARRISON CO
KAUFMAN CO
TARRANT CO
JOHNSON CO
ELLIS CO
SMITH CO
GREGG CO
VAN ZANDT CO
HENDERSON CO
HILL CO
NAVARRO CO
CHEROKEE CO
ANDERSON CO
PANOLA CO
SHELBY CO
RUSK CO
NACOGDOCHES
FREESTONE CO
MC LENNAN CO
HOUSTON CO
ANGELINA CO
SABINE CO
SAN AUGUSTINE CO
LIMESTONE CO
LEON CO
BELL CO
FALLS CO
ROBERTSON CO
TRINITY CO
MILAM CO
MADISON CO
POLK CO
WILLIAMSON CO
WALKER CO
BRAZOS CO
GRIMES CO
TYLER CO
HARDIN CO
JASPER CO
NEWTON CO
LEE CO
BURLESON CO
WASHINGTON CO
MONTGOMERY CO
SAN JACINTO CO
LIBERTY CO
ORANGE CO
CALDWELL CO
BASTROP CO
FAYETTE CO
AUSTIN CO
HARRIS CO
WALLER CO
CHAMBERS CO
JEFFERSON CO
FORT BEND CO
GALVESTON CO
GONZALES CO
DEWITT CO
COLORADO CO
WHARTON CO
LAVACA CO
BRAZORIA CO
Gulf of Mexico
Key Map

Figure 7


TEXAS FOREST SERVICE
A Part of The Texas A & M University System
EAST TEXAS
1969
Legend
Counties Reporting Pine Tip Moth Damage
OKLAHOMA
ARKANSAS
GRAYSON CO
COLLIN CO
FANNIN CO
HUNT CO
LAMAR CO
DELTA CO
RED RIVER CO
FRANKLIN CO
TITUS CO
MORRIS CO
BOWIE CO
Texarkana
ARKANSAS
LOUISIANA
DALLAS CO
ROCKWALL
HOPKINS CO
RAINS CO
WOOD CO
CAMP CO
UPSHUR CO
MARION CO
CASS CO
HARRISON CO
Fort Worth
Dallas
KAUFMAN CO
TARRANT CO
JOHNSON CO
ELLIS CO
SMITH CO
GREGG CO
VAN ZANDT CO
HENDERSON CO
Tyler
HILL CO
NAVARRO CO
CHEROKEE CO
Carthage
PANOLA CO
SHELBY CO
ANDERSON CO
FREESTONE CO
ROSK CO
NACOGDOCHES
MC LENNAN CO
Waco
HOUSTON CO
ANGELINA CO
SABINE CO
SAN AUGUSTINE CO
Crockett
Jasper
LEON CO
LIMESTONE CO
FALLS CO
ROBERTSON CO
BELL CO
MILAM CO
MADISON CO
TRINITY CO
POLK CO
WALKER CO
Livingston
WILLIAMSON CO
BRAZOS CO
GRIMES CO
Bryan
TYLER CO
HARDIN CO
JASPER CO
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LEE CO
BURLESON CO
WASHINGTON CO
SAN JACINTO CO
LIBERTY CO
ORANGE CO
Beaumont
CALDWELL CO
BASTROP CO
FAYETTE CO
AUSTIN CO
HARRIS CO
WALLER CO
CHAMBERS CO
JEFFERSON CO
FORT BEND CO
GALVESTON CO
GONZALES CO
DEWITT CO
LAVACA CO
COLORADO CO
WHARTON CO
BRAZORIA CO
Gulf of Mexico
Key Map

corculus and *Tetyra bipunctata*. A beetle which seems to be only a secondary cause of conelet death is *Pityophthorus pulicarius*.

Control tests with Thimet and Di-Syston were continued during 1969 with more success than in the last two years. Using 10 percent granular Thimet and 10 percent granular Di-Syston, the best results were obtained with 3 to 4 pounds of Thimet which gave a 50 percent reduction in infestation as compared with check trees. These results may have been partly attributed to the residual effects from the two previous years of application in conjunction with the 1969 treatments. Tests will be continued in 1970. These controls are for use in high-value seed orchards and are not recommended for entire forests.

Diseases

ANNOSUS ROOT ROT *Fomes annosus*. The most destructive disease of pine trees in East Texas is *Fomes annosus*. Infection is currently restricted to less than 8 percent of the pine plantations but will undoubtedly spread rapidly as more plantations are thinned.

Rate-of-spread plots have been established throughout the pine range in East Texas. Trees surrounding known infection centers were mapped and placed into one of four categories; healthy, green with annosus fruiting, red top, and black top. Rechecks of each of these plots revealed that from 0 to 30 percent of the trees changed categories during 1969.

Increment-core samples were collected from all trees surrounding the infection center in which no activity was observed. These core samples were incubated on malt agar in the laboratory to determine the presence or absence of annosus; however, no *Fomes annosus* was obtained from any of the samples. This finding supports the theory that annosus does die out on certain sites over a period of time, as has been observed in several locations in East Texas. Physical and chemical properties of the soil in each of the rate-of-spread plots are being examined in an attempt to correlate annosus activity with soil type.

Regeneration plots were established in 1967 to determine the effects of annosus infection on second generation planting on known infected sites. Seedling mortality caused by annosus has been observed in natural regeneration, but no infection of planted seedlings in existing plots has been confirmed. Observations will continue in these areas to determine if, and at what age, annosus becomes a factor in second generation plantation management.

Borax treatment of freshly cut stump surfaces is still considered the most effective control technique. Stumps on approximately 1600 acres of thinned pine plantations were treated in 1969, in which more than 16,000 pounds of borax were used.

FUSIFORM RUST *Cronartium fusiforme*. A survey of 60 randomly selected, unthinned pine plantations was conducted late in 1969 by the Texas Forest Service. The survey indicated that fusiform rust is not the serious problem in East Texas as elsewhere across the South.

Infection was found in more than 98 percent of the plantations sampled. Heaviest infection occurs in extreme Southeast Texas where an average of 19 percent of the trees had trunk infections. A copy of the report can be obtained from the Forest Pest Control Section.

Other

HAIL. A hail storm in April 1969 resulted in varying degrees of defoliation of pine and hardwood trees on approximately 30,000 acres in Southeast Texas.

A recheck of the damage in September revealed that approximately 80 percent of the affected pines had died, mainly as a result of *Ips* attack. Hardwood species were very slow to recover and maintained distinct signs of damage in early Autumn.